THE DOE RUN COMPANY

Remediation Group

Mark Nations
Mining Properties Manager
mnations@doerun.com

January 10, 2014

Mr. Jason Gunter
Remedial Project Manager
U.S. Environmental Protection Agency
Region 7 - Superfund Branch
11201 Renner Blvd.
Lenexa, KS 66219

Re: The Doe Run Company – Elvins/Rivermines Mine Tailings Site Monthly Progress Report

Dear Mr. Gunter:

As required by Article VI, Section 56 of the Unilateral Administrative Order (UAO) (CERCLA-07-2005-0169) for the referenced project and on behalf of The Doe Run Company, the progress report for the period December 1, 2013 through December 31, 2013 is enclosed. If you have any questions or comments, please call me at 573-518-0800.

Sincerely,

Mark Nations
Mining Properties Manager

Enclosures
c: Mark Yingling – TDRC (electronic only)
Matt Wohl – TDRC (electronic only)
Robert Hinkson – MDNR
Brandon Wiles – MDNR
Ty Morris – Barr Engineering

1221 Mill Street, Leadwood, MO 63653
Telephone: (573) 562-7793

Elvins/Rivermines Mine Tailings Site
Park Hills, Missouri
Removal Action - Monthly Progress Report
Period: December 1, 2013 December 31, 2013

1. **Actions Performed and Problems Encountered This Period:**

   a. During this period, flow through the pilot test was directed in two separate configurations. In the first flow configuration, water from the seepage pond passed through the roughing filter and discharged through the bypass pipe. In the second configuration, flow from the seepage pond passed through the iron filter and discharged into the round tank. From the round tank, it discharged directly into the effluent channel.

   b. The roughing filter was observed to be overflowing on December 2, 2013 and December 4, 2013. It is anticipated this is due to sediment buildup in the roughing filter. The bypass valve was opened further on both occasions to alleviate head loss and lower the water surface elevation of the roughing filter.

   c. Continued collecting analytical samples from the pilot test two to three times per week. Samples were taken from the seepage pond (system influent), the ZVI filter effluent (RMP-Polish), and the roughing filter effluent (RMP-Rough).

   d. Continued to take analytical samples from the seep pond effluent and the western treatment pond effluent to monitor the metals reduction of the treatment pond.

   e. Flow through the seepage ponds was not measured this period.

   f. Flow to the east treatment cell remained off throughout this period.

2. **Analytical Data and Results Received This Period:**

   a. Dissolved zinc concentrations in the polishing filter effluent ranged between 16.79 mg/L and 20.22 mg/L.

   b. Total zinc concentrations in the polishing filter effluent ranged between 15.43 mg/L and 19.91 mg/L.

   c. Total iron concentrations in the polishing filter effluent ranged between 0.002 mg/L and 0.025 mg/L.

   d. Total suspended solids concentrations in the polishing filter were non-detect in all samples.

   e. During this period, water samples were collected from just upstream of Old Missouri Highway 32, as well as from upstream and downstream of the confluence of the site discharge with Flat River. The analytical results for this event are included with this progress report.

   f. During this period, the Ambient Air Monitoring Reports for September 2013 and Third Quarter 2013 were completed. Any issues identified in these reports are discussed below. A copy of these documents has been sent to your attention.

      The September 2013 Ambient Air Monitoring Report noted the following:

      - The action levels for lead and dust were not exceeded.
      - No samples were taken with the TSP monitors on 9/2/13 due to the holiday.
      - There was a QA blank filter for the Big River #4 and Big River #4 QA TSP and PM_{10} monitors on 9/16/13.
      - No sample was taken on the Big River #4 TSP monitor on 09/18/13 due to a mechanical failure. Upon discovery, this issue was addressed.
      - No sample was taken on the Big River #4 TSP monitor on 09/20/13 due to an issue with the timer. Upon discovery, this issue was addressed.

      The Third Quarter 2013 Ambient Air Monitoring Report noted the following:

      - The action levels for lead and dust were not exceeded.

- No samples were taken with the TSP monitors on 07/04/13 and 07/05/13 due to the holiday.
- No samples were taken with the PM_{10} monitors on 07/06/13 due to the holiday.
- No sample was taken on the Big River #4 TSP monitor on 07/29/13 due to the run time of the monitor being outside of the acceptable limits. This issue has been addressed.
- No sample was taken on the Rivermines #2 (Wood and Barton) TSP monitor on 07/29/13 due to the run time of the monitor being outside of the acceptable limits. This issue has been addressed.
- Chain-of-custody date issues were corrected for the Big River #4 QA TSP monitor for filter ID numbers 8803575 and 8803551.
- No sample was taken with the Rivermines #3 (Water Plant) TSP monitor on 08/20/13 due to a mechanical failure. Upon discovery, this issue was corrected.
- No samples were taken with the TSP monitors on 9/2/13 due to the holiday.
- There was a QA blank filter for the Big River #4 and Big River #4 QA TSP and PM_{10} monitors on 9/16/13.
- No sample was taken on the Big River #4 TSP monitor on 09/18/13 due to a mechanical failure. Upon discovery, this issue was addressed.
- No sample was taken on the Big River #4 TSP monitor on 09/20/13 due to an issue with the timer. Upon discovery, this issue was addressed.

3. Developments Anticipated and Work Scheduled for Next Period:

a. Continue analytical sampling and field measurements three times a week. No WET tests are planned.

b. Continue to operate the renovated pilot test.

c. Complete monthly water sampling activities as described in the Removal Action Work Plan.

d. Complete air monitoring activities as described in the Removal Action Work Plan.

e. Continue monitoring the western treatment pond to evaluate the hydraulics and the metals reduction.

f. Continue preliminary work on a long-term surface water management plan including treatment and disposal/discharge options for the seepage from the tailings pile that is currently treated in the biocells.

4. Changes in Personnel:

a. None.

5. Issues or Problems Arising This Period:

a. None.

6. Resolution of Issues or Problems Arising This Period:

a. None.

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/2/13	13-3760	RMP SEEP T	41.2	19450^	4.1	26.5	491.8	34.8	2.7	148	986		7.39	4
		RMP SEEP D		20010^***					3.9***					
12/2/13	13-3761	RMP ROUGH T	ND	8597^	0.75 J	0.15 J	923.0	37.8	351.0	146	964		7.07	4
		RMP ROUGH D		8575^					336.0					
12/2/13	13-3762	RMP POLISH T	16.1	19730^	3.4	26.9	507.1	39.0	25.3	148	959	ND	7.45	1
		RMP POLISH D		20220^***					15.0					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

The DOE RUN Company

Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3760,L13-0001-3761,L13-0001-3762

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/3/13	
Copper	ug/L	0.51	0.97	12/3/13	
Lead	ug/L	0.46	2.7	12/3/13	
Zinc	ug/L	0.95	0.91	12/3/13	
Nickel	ug/L	0.71	0.86	12/3/13	
Thallium	ug/L	ND	1.86	12/3/13	
Iron	ug/L	0.53	2.0	12/3/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	536	107%	85-115%	
Copper	ug/L	500	539	108%	85-115%	
Lead	ug/L	500	529	106%	85-115%	
Zinc	ug/L	500	543	109%	85-115%	
Nickel	ug/L	500	534	107%	85-115%	
Iron	ug/L	500	532	106%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3760 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.04	500	500	515	522	103%	104%	70-130%	
Copper	ug/L	0.83	500	500	520	529	104%	106%	70-130%	
Lead	ug/L	0.82	500	500	511	520	102%	104%	70-130%	
Zinc	ug/L	194	500	500	713	721	104%	105%	70-130%	
Nickel	ug/L	6.5	500	500	521	529	103%	105%	70-130%	
Iron	ug/L	0	500	500	508	514	102%	103%	70-130%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3760,L13-0001-3761,L13-0001-3762

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.96	5	12/5/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	97	97%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	97	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3761

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	146	146	100%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.99	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.00	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.99	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	4.02	3.95-4.05	L13-0002-0040
Slope	96.3%	90-102%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3760,L13-0001-3761,L13-0001-3762

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/3/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3760

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	9.9	4	13.8	13.7	98%	95%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.8	96%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3762

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12/4/13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3762

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	0.5	0	

LABORATORY CONTROL SAMPLE L13-0002-0065

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

The DOE RUN Company

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	CF
IC	JAA

Report Acceptance	
QAO	Date
GWP	12/6/2013
Manager	Date
EJS	12/6/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/4/13	13-3780	RMP SEEP T	34.0	19210 ^	2.1	24.7	501.4	26.8	ND	147	847		7.35	2
		RMP SEEP D		18920^					0.40 J***					
12/4/13	13-3781	RMP POLISH T	10.8	19910^	1.0	26.2	512.5	26.5	24.8	149	904	ND	7.53	0
		RMP POLISH D		20150^***					13.1					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3780,L13-0001-3781

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/4/13	
Copper	ug/L	ND	0.97	12/4/13	
Lead	ug/L	ND	2.7	12/4/13	
Zinc	ug/L	ND	0.91	12/4/13	
Nickel	ug/L	ND	0.86	12/4/13	
Thallium	ug/L	ND	1.86	12/4/13	
Iron	ug/L	ND	2.0	12/4/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	554	111%	85-115%	
Copper	ug/L	500	535	107%	85-115%	
Lead	ug/L	500	537	107%	85-115%	
Zinc	ug/L	500	560	112%	85-115%	
Nickel	ug/L	500	534	107%	85-115%	
Iron	ug/L	500	528	106%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3780 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0	500	500	539	548	108%	110%	70-130%	
Copper	ug/L	0	500	500	514	525	103%	105%	70-130%	
Lead	ug/L	0	500	500	523	531	105%	106%	70-130%	
Zinc	ug/L	192	500	500	734	743	108%	110%	70-130%	
Nickel	ug/L	2.7	500	500	523	533	104%	106%	70-130%	
Iron	ug/L	0	500	500	509	517	102%	103%	70-130%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3780,L13-0001-3781

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.96	5	12/5/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	97	97%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	97	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3780

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	147	147	100%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.99	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.00	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.99	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	4.02	3.95-4.05	L13-0002-0040
Slope	96.3%	90-102%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3780,L13-0001-3781

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/4/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3780

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	8.5	4	12.7	12.5	105%	100%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3781

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12/4/13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3781

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	0	0	

LABORATORY CONTROL SAMPLE L13-0002-0065

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

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QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	CF
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/6/2013
Manager	Date
EJS	12/6/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/8/13	13-3782	RMP SEEP T	13.7	18140^	3.1	23.9	458.5	28.3	21.8	150	812		7.64	2
		RMP SEEP D		18230^***					12.8					
12/8/13	13-3783	RMP POLISH T	38.6	18270^	3.7	22.8	462.1	30.0	2.2	154	786	ND	7.79	0
		RMP POLISH D		18330^***					2.1					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3782,L13-0001-3783

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/9/13	
Copper	ug/L	ND	0.97	12/9/13	
Lead	ug/L	0.75	2.7	12/9/13	
Zinc	ug/L	ND	0.91	12/9/13	
Nickel	ug/L	1.4	0.86	12/9/13	
Thallium	ug/L	ND	1.86	12/9/13	
Iron	ug/L	ND	2.0	12/9/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	550	110%	85-115%	
Copper	ug/L	500	527	105%	85-115%	
Lead	ug/L	500	528	106%	85-115%	
Zinc	ug/L	500	560	112%	85-115%	
Nickel	ug/L	500	535	107%	85-115%	
Iron	ug/L	500	527	105%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3782 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.19	500	500	533	525	107%	105%	70-130%	
Copper	ug/L	0.52	500	500	506	503	101%	100%	70-130%	
Lead	ug/L	1.2	500	500	518	511	103%	102%	70-130%	
Zinc	ug/L	181	500	500	720	707	108%	105%	70-130%	
Nickel	ug/L	7.2	500	500	528	521	104%	103%	70-130%	
Iron	ug/L	0.06	500	500	514	507	103%	101%	70-130%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3782,L13-0001-3783

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	12/12/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	93	93%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	94	94%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3782

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	150	152	101%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.04	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.06	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	10.02	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.99	3.95-4.05	L13-0002-0040
Slope	95.7%	90-102%	

The DOE RUN Company

Quentin J. Schmidt Analytical Laboratory
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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3782,L13-0001-3783

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/09/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3782

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	8.1	4	11.6	11.5	88%	85%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	4	3.9	98%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3783

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12/10/13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3783

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	1	1	

LABORATORY CONTROL SAMPLE L13-0002-0065

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

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(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	JAA
Alka	CF
IC	JAA

Report Acceptance	
QAO	Date
GWP	12/12/2013
Manager	Date
EJS	12/12/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/11/13	13-3796	RMP SEEP T	42.7	18520^	3.2	22.1	502.2	27.7	3.7	162	721		7.57	0
		RMP SEEP D		18220^					1.7 J					
12/11/13	13-3997	RMP POLISH T	13.8	18150^	2.8	23.6	465.2	26.8	21.1	159	739	ND	7.82	0
		RMP POLISH D		17660^					14.4					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3796,L13-0001-3797

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.05	0.38	12/11/13	
Copper	ug/L	0.03	0.97	12/11/13	
Lead	ug/L	0.31	2.7	12/11/13	
Zinc	ug/L	0.45	0.91	12/11/13	
Nickel	ug/L	0.66	0.86	12/11/13	
Thallium	ug/L	0.13	1.86	12/11/13	
Iron	ug/L	0.08	2.0	12/11/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	525	572	109%	85-115%	
Copper	ug/L	525	565	108%	85-115%	
Lead	ug/L	525	567	108%	85-115%	
Zinc	ug/L	525	585	111%	85-115%	
Nickel	ug/L	525	567	108%	85-115%	
Iron	ug/L	525	565	108%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3796 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.28	500	500	561	549	112%	110%	70-130%	
Copper	ug/L	0	500	500	548	541	110%	108%	70-130%	
Lead	ug/L	1	500	500	548	539	109%	108%	70-130%	
Zinc	ug/L	185	500	500	753	740	114%	111%	70-130%	
Nickel	ug/L	6.7	500	500	558	547	110%	108%	70-130%	
Iron	ug/L	0	500	500	560	544	112%	109%	70-130%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3796,L13-0001-3797

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	12/12/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	93	93%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	94	94%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3796

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	162	164	101%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.00	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.04	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.06	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	10.02	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.99	3.95-4.05	L13-0002-0040
Slope	95.7%	90-102%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3796,L13-0001-3797

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/11/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3796

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	7.2	4	11.6	11.7	110%	113%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3796,L13-0001-3797

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12-11-13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13.3797

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	2	2	

LABORATORY CONTROL SAMPLE L13-0002-0065

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

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(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	CF
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/16/2013
Manager	Date
EJS	12/16/2013

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SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/13/13	13-3813	RMP SEEP T	38.6	19020^	3.1	23.0	482.1	29.2	2.0	160	892		7.48	4
		RMP SEEP D		18900^					1.8 J					
12/13/13	13-3814	RMP POLISH T	12.5	18670^	2.9	24.4	466.3	27.3	17.8	157	837	ND	7.83	1
		RMP POLISH D		18430^					3.1					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3813,L13-0001-3814

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/16/13	
Copper	ug/L	ND	0.97	12/16/13	
Lead	ug/L	ND	2.7	12/16/13	
Zinc	ug/L	0.14	0.91	12/16/13	
Nickel	ug/L	1.4	0.86	12/16/13	
Thallium	ug/L	ND	1.86	12/16/13	
Iron	ug/L	ND	2.0	12/16/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	545	109%	85-115%	
Copper	ug/L	500	523	105%	85-115%	
Lead	ug/L	500	534	107%	85-115%	
Zinc	ug/L	500	556	111%	85-115%	
Nickel	ug/L	500	536	107%	85-115%	
Iron	ug/L	500	532	106%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3813 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.17	500	500	489	542	98%	108%	70-130%	
Copper	ug/L	0.23	500	500	471	520	94%	104%	70-130%	
Lead	ug/L	0	500	500	477	530	95%	106%	70-130%	
Zinc	ug/L	190	500	500	683	736	99%	109%	70-130%	
Nickel	ug/L	7	500	500	486	537	96%	106%	70-130%	
Iron	ug/L	0.29	500	500	477	539	95%	108%	70-130%	

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(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3813,L13-0001-3814

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	2.45	5	12/17/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	95	95%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	97	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3813

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	160	161	101%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.97	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	9.99	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.96	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.98	3.95-4.05	L13-0002-0040
Slope	96.2%	90-102%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3813,L13-0001-3814

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/16/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3813

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	8.9	1.25	10.3	9.9	112%	80%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: ,L13-0001-3814

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12/16/13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3814

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	1	1	

LABORATORY CONTROL SAMPLE L13-0002-0077

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

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Vibumum, MO 65566
(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	JAA
Alka	CF
IC	JAA

Report Acceptance	
QAO	Date
GWP	12/18/2013
Manager	Date
EJS	12/18/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/16/13	13-3818	RMP SEEP T	36.1	16970^	3.6	21.2	435.4	24.6	0.56 J	159	723		7.69	1
		RMP SEEP D		17010^***					1.3 J***					
12/16/13	13-3819	RMP POLISH T	14.0	17320^	2.9	23.7	452.1	26.7	19.0	158	750	ND	7.69	1
		RMP POLISH D		17840^***					12.9					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3818,L13-0001-3819

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/16/13	
Copper	ug/L	0.21	0.97	12/16/13	
Lead	ug/L	ND	2.7	12/16/13	
Zinc	ug/L	4.0	0.91	12/16/13	
Nickel	ug/L	ND	0.86	12/16/13	
Thallium	ug/L	ND	1.86	12/16/13	
Iron	ug/L	ND	2.0	12/16/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	526	105%	85-115%	
Copper	ug/L	500	517	103%	85-115%	
Lead	ug/L	500	516	103%	85-115%	
Zinc	ug/L	500	536	107%	85-115%	
Nickel	ug/L	500	519	104%	85-115%	
Iron	ug/L	500	517	103%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3818 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.32	500	500	530	514	106%	103%	70-130%	
Copper	ug/L	0.42	500	500	514	503	103%	101%	70-130%	
Lead	ug/L	0.43	500	500	518	498	104%	100%	70-130%	
Zinc	ug/L	169	500	500	706	680	107%	102%	70-130%	
Nickel	ug/L	5.3	500	500	526	505	104%	100%	70-130%	
Iron	ug/L	0	500	500	517	499	103%	100%	70-130%	

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3818,L13-0001-3819

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	2.45	5	12/17/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	95	95%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	97	97%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3818

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	159	158	99%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	6.97	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	9.99	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.96	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.98	3.95-4.05	L13-0002-0040
Slope	96.2%	90-102%	

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Quentin J. Schmidt Analytical Laboratory
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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3818,L13-0001-3819

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/16/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3818

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	7.2	4	10.8	10.6	90%	85%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.3	86%	85-115	

The DOE RUN Company

Quentin J. Schmidt Analytical Laboratory
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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3819

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12/16/13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3819

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	0	0	

LABORATORY CONTROL SAMPLE L13-0002-0077

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

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(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	JAA
Alka	CF
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/18/2013
Manager	Date
EJS	12/18/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/18/13	13-3846	RMP SEEP T	41.7	18330^	3.0	20.8	495.2	30.0	2.3	166	764		7.48	0
		RMP SEEP D		18780^***					2.3					
12/18/13	13-3847	RMP POLISH T	14.5	18020^	2.2	24.1	486.1	30.7	21.6	167	767	ND	7.41	0
		RMP POLISH D		18000^					10.9					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
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SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3846,L13-0001-3847

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	0.004	0.38	12/18/13	
Copper	ug/L	0.05	0.97	12/18/13	
Lead	ug/L	ND	2.7	12/18/13	
Zinc	ug/L	2.1	0.91	12/18/13	
Nickel	ug/L	ND	0.86	12/18/13	
Thallium	ug/L	0.10	1.86	12/18/13	
Iron	ug/L	ND	2.0	12/18/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	534	107%	85-115%	
Copper	ug/L	500	520	104%	85-115%	
Lead	ug/L	500	529	106%	85-115%	
Zinc	ug/L	500	544	109%	85-115%	
Nickel	ug/L	500	533	107%	85-115%	
Iron	ug/L	500	523	105%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3846 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.31	500	500	520	523	104%	105%	70-130%	
Copper	ug/L	0.22	500	500	497	496	99%	99%	70-130%	
Lead	ug/L	0.42	500	500	514	517	103%	103%	70-130%	
Zinc	ug/L	183	500	500	704	712	104%	106%	70-130%	
Nickel	ug/L	5.9	500	500	525	527	104%	104%	70-130%	
Iron	ug/L	0.58	500	500	506	512	101%	102%	70-130%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3846,L13-0001-3847

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.96	5	12/18/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	99	99%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	99	99%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3847

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	167	167	100%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.04	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.05	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.00	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	10.02	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	4.01	3.95-4.05	L13-0002-0040
Slope	96.8%	90-102%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3846,L13-0001-3847

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/18/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3846

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	7.6	4	10.9	11	83%	85%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.4	88%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3847

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12/18/13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3847

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	2.5	2.5	

LABORATORY CONTROL SAMPLE L13-0002-0077

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

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(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	CF
IC	TLL

Report Acceptance	
QAO	Date
GWP	12/20/2013
Manager	Date
EJS	12/20/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/20/13	13-3895	RMP SEEP T	41.3	18710^	3.5	23.6	490.2	29.8	1.6 J	161	691^		7.44	1
		RMP SEEP D		18410^					1.8J***					
12/20/13	13-3896	RMP POLISH T	16.3	18850^	3.2	28.9	511.9	32.9	19.3	163	753^	ND	7.77	3
		RMP POLISH D		19150^***					11.4					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3895,L13-0001-3896

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/20/13	
Copper	ug/L	ND	0.97	12/20/13	
Lead	ug/L	ND	2.7	12/20/13	
Zinc	ug/L	0.98	0.91	12/20/13	
Nickel	ug/L	ND	0.86	12/20/13	
Thallium	ug/L	ND	1.86	12/20/13	
Iron	ug/L	ND	2.0	12/20/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	543	109%	85-115%	
Copper	ug/L	500	525	105%	85-115%	
Lead	ug/L	500	530	106%	85-115%	
Zinc	ug/L	500	550	110%	85-115%	
Nickel	ug/L	500	533	107%	85-115%	
Iron	ug/L	500	528	106%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3895 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.27	500	500	531	553	106%	111%	70-130%	
Copper	ug/L	0.03	500	500	512	535	102%	107%	70-130%	
Lead	ug/L	0	500	500	516	537	103%	107%	70-130%	
Zinc	ug/L	187	500	500	714	739	105%	110%	70-130%	
Nickel	ug/L	6	500	500	525	542	104%	107%	70-130%	
Iron	ug/L	0	500	500	514	529	103%	106%	70-130%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3895,L13-0001-3896

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	ND	5	12/19/13	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	96	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	99	99%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3895

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	161	162	101%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.01	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.00	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.97	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.97	3.95-4.05	L13-0002-0040
Slope	96.7%	90-102%	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3895,L13-0001-3896

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/27/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3895

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	6.9	4	10.7	10.7	95%	95%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115	

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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3896

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	12-20-13	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3896

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	ND	ND	

LABORATORY CONTROL SAMPLE L13-0002-0077

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

The DOE RUN Company

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	JAA
Alka	CF
IC	JAA

Report Acceptance	
QAO	Date
JAA	12/30/2013
Manager	Date
EJS	12/30/2013

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/23/13	13-3906	RMP SEEP T	43	17270^	5.5	20	496	27	4.1	171	643^		7.69	0
		RMP SEEP D		17570^***					2.4					
12/23/13	13-3907	RMP POLISH T	13	16310^	3.4	21	464	23	17	166	700^	ND	7.90	1
		RMP POLISH D		16980^***					3.2					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

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SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3906,L13-0001-3907

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	.58	0.38	12-26-13	
Copper	ug/L	ND	0.97	12-26-13	
Lead	ug/L	ND	2.7	12-26-13	
Zinc	ug/L	1.7	0.91	12-26-13	
Nickel	ug/L	12	0.86	12-26-13	
Thallium	ug/L	3.2	1.86	12-26-13	
Iron	ug/L	ND	2.0	12-26-13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	493	99%	85-115%	
Copper	ug/L	500	482	96%	85-115%	
Lead	ug/L	500	486	97%	85-115%	
Zinc	ug/L	500	584	117%	85-115%	
Nickel	ug/L	500	493	99%	85-115%	
Iron	ug/L	500	495	99%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3906 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.36	500	500	526	525	105%	105%	70-130%	
Copper	ug/L	0.22	500	500	531	530	106%	106%	70-130%	
Lead	ug/L	0.1	500	500	506	506	101%	101%	70-130%	
Zinc	ug/L	173	500	500	698	693	105%	104%	70-130%	
Nickel	ug/L	6	500	500	516	516	102%	102%	70-130%	
Iron	ug/L	0	500	500	529	530	106%	106%	70-130%	

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Viburnum, MO 65566
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QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3906,L13-0001-3907

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	1/2/14	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	96	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	95	95%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3906

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	171	172	101%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.01	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.00	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.97	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.99	3.95-4.05	L13-0002-0040
Slope	96.5%	90-102%	

The DOE RUN Company

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(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3906,L13-0001-3907

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/27/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3906 1/100 dil.

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	6.4	4	9.5	9.5	78%	78%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.5	90%	85-115	

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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3907

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	1/2/14	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3907

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	0	0.5	

LABORATORY CONTROL SAMPLE L13-0002-0077

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

The DOE RUN Company

Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	TLL
Alka	CF
IC	TLL

Report Acceptance	
QAO	Date
GWP	1/6/2014
Manager	Date
EJS	1/6/2014

THE DOE RUN COMPANY

SEMO DIVISION -- CENTRAL LABORATORY

PO BOX 500 VIBURNUM, MISSOURI Ph 573-244-8105 Fax 573-244-8181

Sample Date	Lab Number	Sample Name	Pb ug/l	Zn ug/l	Cu ug/l	Cd ug/l	Ni ug/l	Tl ug/l	Fe ug/l	Alka mg/l	S04 mg/l	TSS mg/l	pH mg/l	Turbidity FAU
12/27/13	13-3916	RMP SEEP T	38	16950^	2.6	21	426	31	1.4J	159	726		7.62	0
		RMP SEEP D		16830^					1.4J					
12/27/13	13-3917	RMP POLISH T	14	17040^	2.6	24	437	31	19	160	720	ND	7.9	1
		RMP POLISH D		16790^					3.6					

RL	2.7	0.91	0.97	0.38	0.86	1.4	2
MDL	0.85	0.28	0.3	0.12	0.27	0.58	0.34

The DOE RUN Company

Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

SEMO PROJECT: Rivermines

ANALYSIS METHOD: EPA 200.7

ANALYSIS DESCRIPTION: 200.7 Metals, Total

METHOD BLANK

Associated Lab Samples: L13-0001-3916,L13-0001-3917

	Units	Blank Result	RL	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.38	12/30/13	
Copper	ug/L	ND	0.97	12/30/13	
Lead	ug/L	ND	2.7	12/30/13	
Zinc	ug/L	ND	0.91	12/30/13	
Nickel	ug/L	ND	0.86	12/30/13	
Thallium	ug/L	ND	1.86	12/30/13	
Iron	ug/L	ND	2.0	12/30/13	

LABORATORY CONTROL SAMPLE, TOTAL

Parameter	Units	Spike Conc.	LCS Results	Rec	Limits	Qualifiers
Cadmium	ug/L	500	535	107%	85-115%	
Copper	ug/L	500	512	102%	85-115%	
Lead	ug/L	500	531	106%	85-115%	
Zinc	ug/L	500	542	108%	85-115%	
Nickel	ug/L	500	520	104%	85-115%	
Iron	ug/L	500	509	102%	85-115%	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE

SAMPLE NUMBER / NAME: 13-3916 1/100 dil

Parameter	Units	Results	Conc	Spike	Results	Results	Rec	Rec	Limits	Qual
Cadmium	ug/L	0.23	500	500	533	529	107%	106%	70-130%	
Copper	ug/L	0.05	500	500	505	497	101%	99%	70-130%	
Lead	ug/L	0.51	500	500	530	525	106%	105%	70-130%	
Zinc	ug/L	170	500	500	703	696	107%	105%	70-130%	
Nickel	ug/L	5.9	500	500	515	512	102%	101%	70-130%	
Iron	ug/L	0	500	500	495	489	99%	98%	70-130%	

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM 2320B

ANALYSIS DESCRIPTION: 2320B Alkalinity

METHOD BLANK

Associated Lab Samples: L13-0001-3916,L13-0001-3917

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity	mg/L	1.97	5	1/3/14	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	96	96%	85-115%	

LABORATORY CONTROL SAMPLE DUPLICATE

Parameter	Units	Spike Conc	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	100	95	95%	85-115%	

LABORATORY SAMPLE DUPLICATE 13-3916

Parameter	Units	Results	Results Dup	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity	mg/L CaCO3	159	159	100%	85-115%	

pH SM4500-H+I	Results	QC Limits	Lab Standard Number
ICV Buffer 7.00	7.01	6.95-7.05	L13-0002-0038
ICV Buffer 4.00	4.02	3.95-4.05	L13-0002-0037
ICV Buffer 10.01	10.00	9.96-10.06	L13-0002-0039
CCV Buffer 10.0(	9.97	9.96-10.06	L13-0002-0044
CCV Buffer 4.05	3.99	3.95-4.05	L13-0002-0040
Slope	96.5%	90-102%	

The DOE RUN Company

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Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: IC 300.00

ANALYSIS DESCRIPTION: ION CHROMOTOGRAPH 300.0

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3916,L13-0001-3917

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/l	ND	0.63	12/20/13	

MATRIX SPIKE SAMPLE

SAMPLE NUMBER / NAME: 13-3916 1/100 dil.

Parameter	Units	Results	MS Spike Conc	MS Results	MSD Results	% Rec	MSD % Rec	Rec Limits	Qual
Sulfate	mg/l	7.3	4	11.2	10.8	98%	88%	75-125	

LABORATORY CONTROL SAMPLE

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/l	5	4.6	92%	85-115	

The DOE RUN Company

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43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALITY CONTROL DATA

SEMO PROJECT: Rivermines

ANALYSIS METHOD: SM2540D

ANALYSIS DESCRIPTION: SM2540D Total Suspended Solids

METHOD BLANK MATRIX:Water

Associated Lab Samples: L13-0001-3917

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/l	ND	5	1/2/14	

LAB DUPLICATE

SAMPLE NUMBER / NAME: 13-3917

Parameter	Units	Results	Duplicate	Qual
Total Suspended Solids	mg/l	0	0.5	

LABORATORY CONTROL SAMPLE L13-0002-0077

Parameter	Units	Spike Conc.	LCS Results	LCS % Rec	% Rec Limits	Qualifiers
Total Suspended Solids	mg/l	5	5	100%	85-115	

The DOE RUN Company

Quentin J. Schmidt Analytical Laboratory
43 Iron County Road No 1 Bldg 3
Viburnum, MO 65566
(573) 244-8105

QUALIFIERS

SEMO PROJECT

DEFINITIONS

NA	Not Analyzed
ND	Not detected/ below Method Detection Limit.
B	Potential false positive value based upon blank sample data validation procedures.
E	Estimated value, exceeded the instrument calibration range.
G	Recommended sample preservation, extraction or analysis holding time was exceeded.
J	Lower than reporting limit and higher than MDL and is an estimated value.
K	Per client request, metals analysis was conducted less than 16 hours from sample collection/preservation.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
***	Dissolved result > than associated Total result.
^	1/100 Dilution
	Filtered Samples prepared in the field.

ANALYTE QUALIFIERS

H Analysis conducted outside the EPA method holding time.

M Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

R RPD value was outside control limits.

NES Not enough sample.

Method	Analysts
200.7	JAA
Alka	KLM
IC	JAA

Report Acceptance	
QAO	Date
GWP	1/6/2014
Manager	Date
EJS	1/6/2014

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

January 10, 2014

Amy Sanders
The Doe Run Company
P. O. Box 500
Viburnum, MO 65566

RE: Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Dear Amy Sanders:
Enclosed are the analytical results for sample(s) received by the laboratory on December 31, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jamie Church

jamie.church@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-13-4
Utah Certification #: KS000212013-3
Illinois Certification #: 003097

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60160521001	RIVERMINES 001	Water	12/30/13 11:47	12/31/13 08:15
60160521002	RIVERMINES UPSTREAM	Water	12/30/13 12:08	12/31/13 08:15
60160521003	RIVERMINES DOWNSTREAM	Water	12/30/13 11:36	12/31/13 08:15

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SAMPLE ANALYTE COUNT

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60160521001	RIVERMINES 001	EPA 200.8	SMW	3	PASI-K
		SM 2540D	RAH	1	PASI-K
		SM 2540F	RAH	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60160521002	RIVERMINES UPSTREAM	EPA 6010	TDS	3	PASI-K
		EPA 200.8	SMW	3	PASI-K
		EPA 200.8	SMW	3	PASI-K
		SM 2540D	RAH	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60160521003	RIVERMINES DOWNSTREAM	EPA 6010	TDS	3	PASI-K
		EPA 200.8	SMW	3	PASI-K
		EPA 200.8	SMW	3	PASI-K
		SM 2540D	RAH	1	PASI-K
		EPA 300.0	OL	1	PASI-K

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ANALYTICAL RESULTS

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Sample: RIVERMINES 001 **Lab ID: 60160521001** Collected: 12/30/13 11:47 Received: 12/31/13 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Cadmium	**1.4**	ug/L	0.50	0.050	1	01/02/14 09:20	01/03/14 11:32	7440-43-9	
Lead	**2.8**	ug/L	1.0	0.030	1	01/02/14 09:20	01/03/14 11:32	7439-92-1	
Zinc	**14000**	ug/L	10.0	1.0	1	01/02/14 09:20	01/03/14 11:32	7440-66-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	5.0	5.0	1		01/06/14 13:50		
2540F Total Settleable Solids	Analytical Method: SM 2540F								
Total Settleable Solids	ND	mL/L/hr	0.20	0.20	1		12/31/13 13:53		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**926**	mg/L	100	16.0	100		01/08/14 14:08	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Sample: RIVERMINES UPSTREAM **Lab ID: 60160521002** Collected: 12/30/13 12:08 Received: 12/31/13 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**40600**	ug/L	100	10.4	1	12/31/13 13:00	01/03/14 10:42	7440-70-2	
Magnesium	**24300**	ug/L	50.0	6.5	1	12/31/13 13:00	01/03/14 10:42	7439-95-4	
Total Hardness by 2340B	**201000**	ug/L	500	500	1	12/31/13 13:00	01/03/14 10:42		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Cadmium	ND	ug/L	0.50	0.050	1	01/02/14 09:20	01/03/14 11:36	7440-43-9	
Lead	**0.78J**	ug/L	1.0	0.030	1	01/02/14 09:20	01/03/14 11:36	7439-92-1	
Zinc	**6.1J**	ug/L	10.0	1.0	1	01/02/14 09:20	01/03/14 11:36	7440-66-6	B
200.8 ICPMS, Dissolved (LF)	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Cadmium, Dissolved	ND	ug/L	0.50	0.050	1	01/02/14 16:00	01/03/14 12:29	7440-43-9	
Lead, Dissolved	**0.10J**	ug/L	1.0	0.030	1	01/02/14 16:00	01/03/14 12:29	7439-92-1	B
Zinc, Dissolved	**14.4**	ug/L	10.0	1.0	1	01/02/14 16:00	01/03/14 12:29	7440-66-6	B,D9
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	5.0	5.0	1		01/06/14 13:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**35.8**	mg/L	5.0	0.80	5		01/08/14 14:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Sample: RIVERMINES DOWNSTREAM **Lab ID: 60160521003** Collected: 12/30/13 11:36 Received: 12/31/13 08:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Calcium	**55100**	ug/L	100	10.4	1	12/31/13 13:00	01/03/14 10:48	7440-70-2	
Magnesium	**27800**	ug/L	50.0	6.5	1	12/31/13 13:00	01/03/14 10:48	7439-95-4	
Total Hardness by 2340B	**252000**	ug/L	500	500	1	12/31/13 13:00	01/03/14 10:48		
200.8 MET ICPMS	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Cadmium	**0.26J**	ug/L	0.50	0.050	1	01/02/14 09:20	01/03/14 11:48	7440-43-9	
Lead	**1.7**	ug/L	1.0	0.030	1	01/02/14 09:20	01/03/14 11:48	7439-92-1	
Zinc	**831**	ug/L	10.0	1.0	1	01/02/14 09:20	01/03/14 11:48	7440-66-6	
200.8 ICPMS, Dissolved (LF)	Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Cadmium, Dissolved	**0.098J**	ug/L	0.50	0.050	1	01/02/14 16:00	01/03/14 12:41	7440-43-9	
Lead, Dissolved	**0.44J**	ug/L	1.0	0.030	1	01/02/14 16:00	01/03/14 12:41	7439-92-1	B
Zinc, Dissolved	**712**	ug/L	10.0	1.0	1	01/02/14 16:00	01/03/14 12:41	7440-66-6	
2540D Total Suspended Solids	Analytical Method: SM 2540D								
Total Suspended Solids	ND	mg/L	5.0	5.0	1		01/06/14 13:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**87.2**	mg/L	10.0	1.6	10		01/10/14 10:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(913)599-5665

QUALITY CONTROL DATA

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

QC Batch: MPRP/25783 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 60160521001, 60160521002, 60160521003

METHOD BLANK: 1313701 Matrix: Water
Associated Lab Samples: 60160521001, 60160521002, 60160521003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cadmium	ug/L	ND	0.50	01/03/14 10:59	
Lead	ug/L	ND	1.0	01/03/14 10:59	
Zinc	ug/L	1.5J	10.0	01/03/14 10:59	

LABORATORY CONTROL SAMPLE: 1313702

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	40	42.4	106	85-115	
Lead	ug/L	40	41.2	103	85-115	
Zinc	ug/L	100	112	112	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1313703 1313704

Parameter	Units	60159968005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium	ug/L	ND	40	40	41.1	41.3	103	103	70-130	1	20	
Lead	ug/L	4.2	40	40	46.9	47.0	107	107	70-130	0	20	
Zinc	ug/L	10.2	100	100	113	114	104	104	70-130	1	20	

MATRIX SPIKE SAMPLE: 1313705

Parameter	Units	60160522001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Cadmium	ug/L	2.9	40	44.7	104	70-130	
Lead	ug/L	2.7	40	45.6	107	70-130	
Zinc	ug/L	2680	100	2780	101	70-130	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

QC Batch: MPRP/25790 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60160521002, 60160521003

METHOD BLANK: 1313779 Matrix: Water
Associated Lab Samples: 60160521002, 60160521003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cadmium, Dissolved	ug/L	ND	0.50	01/03/14 13:50	
Lead, Dissolved	ug/L	0.098J	1.0	01/03/14 13:50	
Zinc, Dissolved	ug/L	3.7J	10.0	01/03/14 13:50	

LABORATORY CONTROL SAMPLE: 1313780

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cadmium, Dissolved	ug/L	40	42.3	106	85-115	
Lead, Dissolved	ug/L	40	40.8	102	85-115	
Zinc, Dissolved	ug/L	100	110	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1313781 1313782

Parameter	Units	60160521002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Cadmium, Dissolved	ug/L	ND	40	40	41.1	41.5	103	104	70-130	1	20	
Lead, Dissolved	ug/L	0.10J	40	40	41.8	42.4	104	106	70-130	1	20	
Zinc, Dissolved	ug/L	14.4	100	100	118	120	103	105	70-130	2	20	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

QC Batch: MPRP/25778 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60160521002, 60160521003

METHOD BLANK: 1313405 Matrix: Water
Associated Lab Samples: 60160521002, 60160521003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	01/03/14 10:22	
Magnesium	ug/L	ND	50.0	01/03/14 10:22	
Total Hardness by 2340B	ug/L	ND	500	01/03/14 10:22	

LABORATORY CONTROL SAMPLE: 1313406

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9620	96	80-120	
Magnesium	ug/L	10000	10100	101	80-120	
Total Hardness by 2340B	ug/L		65800			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1313407 1313408

Parameter	Units	60160532001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	28100	10000	10000	37200	37600	91	95	75-125	1	20	
Magnesium	ug/L	4780	10000	10000	14600	14700	98	99	75-125	1	20	
Total Hardness by 2340B	ug/L	89800			153000	154000				1		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

QC Batch: WET/45486 Analysis Method: SM 2540D
QC Batch Method: SM 2540D Analysis Description: 2540D Total Suspended Solids
Associated Lab Samples: 60160521001, 60160521002, 60160521003

METHOD BLANK: 1314343 Matrix: Water
Associated Lab Samples: 60160521001, 60160521002, 60160521003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Suspended Solids	mg/L	ND	5.0	01/06/14 13:44	

SAMPLE DUPLICATE: 1314344

Parameter	Units	60160483001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	116	128	10	25	

SAMPLE DUPLICATE: 1314345

Parameter	Units	60160490001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Suspended Solids	mg/L	ND	ND		25	

REPORT OF LABORATORY ANALYSIS

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

QC Batch: WETA/27759 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60160521001, 60160521002, 60160521003

METHOD BLANK: 1314801 Matrix: Water
Associated Lab Samples: 60160521001, 60160521002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	01/08/14 10:01	

METHOD BLANK: 1315666 Matrix: Water
Associated Lab Samples: 60160521003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	01/10/14 09:31	

LABORATORY CONTROL SAMPLE: 1314802

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	101	90-110	

LABORATORY CONTROL SAMPLE: 1315667

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1314803 1314804

Parameter	Units	60160344001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1060	500	500	1580	1580	105	105	80-120	0	15	

MATRIX SPIKE SAMPLE: 1314805

Parameter	Units	60160344002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	1140	500	1550	80	80-120	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D9	Dissolved result is greater than the total. Data is within laboratory control limits.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NPDES Monthly (Rivermines)
Pace Project No.: 60160521

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60160521002	RIVERMINES UPSTREAM	EPA 3010	MPRP/25778	EPA 6010	ICP/19770
60160521003	RIVERMINES DOWNSTREAM	EPA 3010	MPRP/25778	EPA 6010	ICP/19770
60160521001	RIVERMINES 001	EPA 200.8	MPRP/25783	EPA 200.8	ICPM/2765
60160521002	RIVERMINES UPSTREAM	EPA 200.8	MPRP/25783	EPA 200.8	ICPM/2765
60160521003	RIVERMINES DOWNSTREAM	EPA 200.8	MPRP/25783	EPA 200.8	ICPM/2765
60160521002	RIVERMINES UPSTREAM	EPA 200.8	MPRP/25790	EPA 200.8	ICPM/2766
60160521003	RIVERMINES DOWNSTREAM	EPA 200.8	MPRP/25790	EPA 200.8	ICPM/2766
60160521001	RIVERMINES 001	SM 2540D	WET/45486		
60160521002	RIVERMINES UPSTREAM	SM 2540D	WET/45486		
60160521003	RIVERMINES DOWNSTREAM	SM 2540D	WET/45486		
60160521001	RIVERMINES 001	SM 2540F	WET/45440		
60160521001	RIVERMINES 001	EPA 300.0	WETA/27759		
60160521002	RIVERMINES UPSTREAM	EPA 300.0	WETA/27759		
60160521003	RIVERMINES DOWNSTREAM	EPA 300.0	WETA/27759		

Pace Analytical

Sample Condition Upon Receipt

WO# : 60160521

60160521

Client Name: The Doe Run

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 7975 2444 5742 Pace Shipping Label Used? Yes ☐ No ☒

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other Trip

Thermometer Used: T-239 / T-194 Type of Ice: (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 5.4

Temperature should be above freezing to 6°C

Date and initials of person examining contents: S 12/31

Chain of Custody present:	☒Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☒Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☒Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☒Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☒Yes ☐No ☐N/A	6. See SRO
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	7.
Sufficient volume:	☒Yes ☐No ☐N/A	8.
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	9.
Containers intact:	☒Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☒N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	12.
Sample labels match COC:	☒Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☒Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☒Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☒No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☒No ☐N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☒N/A	17. List State:

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Date

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:

Company:	The Doe Run Company
Address:	PO Box 500
	Viburnum, MO 65566
Email To:	asanders@doerun.com
Phone: 573-689-4535	Fax: 573-244-8179
Requested Due Date/TAT:	5 - 7 Days

Section B Required Project Information:

Report To:	Amy Sanders
Copy To:	
Purchase Order No.:	
Project Name:	NPDES Monthly (Rivermines)
Project Number:	

Section C Invoice Information:

Attention:	Amy Sanders
Company Name:	The Doe Run Company
Address:	PO Box 500, Viburnum, MO 65566
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	4517-12

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER

Site Location STATE: MO

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
	WP
	AR
	OT
	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	TSS	Settleable Solids	Sulfate	Cd, Pb, Zn - Total	Hardness	Cd, Pb, Zn - Dissolved	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N	N	N		60160521
1	Rivermines 001	WW	G			12/30/13	1147		3	2		1							X	X	X	X			N	BP1U, BP3N, BP3U w/
2	Rivermines Upstream	W	G			12/30/13	1208		2	1		1							X		X	X	X	X	N	V 1.5 2(BP3U) ea
3	Rivermines Downstream	W	G			12/30/13	1136		2	1		1							X		X	X	X	X	N	↓ ↓ ea3
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
* 200.8 Total Recoverable Metals	Larry Hopkins Doe Run	12/30/13	1300	Gudelia Mckay / PASI	12/31	815	5.4	Y	Y	Y
**analyzed within 24 hours with flagged data										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Larry Hopkins

SIGNATURE of SAMPLER: Larry Hopkins

DATE Signed (MM/DD/YY): 12/30/13

Temp in °C | Received on ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007